QH359
.E76

Jour (F3) Ha

EVOLUTION

I-4 1927-38

AMNH LIBRARY
100115223

SHOUT
SHARE
IT

FOR THE PEOPLE
FOR EDVCATION
FOR SCIENCE

LIBRARY
OF
THE AMERICAN MUSEUM
OF
NATURAL HISTORY

Gaylord
MULTIBINDER
Syracuse, N. Y.
Stockton, Calif.

Vol. II. No. 3 APRIL 1929 10 Cents

EVOLUTION

Entered as second class matter at New York, N. Y., Jan. 7, 1928. Evolution Publ. Corp., 96-5th Ave., N. Y

In this Issue—

RILEY—McCABE EVOLUTION DEBATE

(Stenographic Record)

EVOLUTION ANNIVERSARY DINNER

PYTHIAN TEMPLE
136 WEST 70th STREET, New York

7 P. M.
FRIDAY, APRIL **26th**

Three Dollars.

Make reservation NOW at EVOLUTION, 96 Fifth Ave., N. Y. - Phone Watkins, 7587

McCabe-Riley Evolution Debate

MECCA AUDITORIUM, New York, Feb. 7, 1929

The Debaters:

Prof. Joseph McCabe, *of England, World's Greatest Popularizer of Science.*

Rev. Wm. B. Riley, *President, World's Christian Fundamentals Association.*

The Chairman:

Justice John Ford *of the New York Supreme Court.*

The Subject:

Resolved: *That Evolution Is True and Should Be Taught in the Schools.*

In opening the meeting, Mr. Allan Strong Broms, Science Editor of EVOLUTION, made the following explanation: "There will be two official decisions, one on the question itself by the audience, the other by a group of judges upon the stage on the merits of the debate. There will also be an unofficial canvas of a group of high school students who are present, to find out how they re-act to the evolutionary and anti-evolutionary arguments, a very vital question tonight." He then turned the meeting over to the chairman of the evening, with the injunction to "make the combatants behave."

THE CHAIRMAN, JUSTICE JOHN FORD:— Ladies and Gentlemen, as I conceive it, we are here to find out from the arguments presented, and from nothing else, upon which side the weight of the evidence lies. You should put the pros and cons as you find them stated by the debaters, and vote accordingly no matter what your personal views may be upon the subject. That is only fair play for the debaters.

The debate will be opened by Professor McCabe of England, who will speak for twenty minutes in favor of the proposition, followed by the Reverend Dr. Riley, who will speak twenty-five minutes in the negative. Then Mr. McCabe will speak twenty minutes and Dr. Riley twenty-five minutes; Professor McCabe closing with five minutes. Then the judges will vote and you will vote.

I have now the great pleasure and the honor of introducing to you Professor Joseph McCabe of England. (Applause.)

———

PROFESSOR JOSEPH McCABE: — Our chairman, no doubt, feels quite at home in this court tonight, but I wonder whether he ever presided over a case in which all the expert witnesses in the world were on one side. I submit to you, first of all, that unless my opponent produces an expert witness—that is the situation you confront tonight.

I want you to understand clearly from the outset the respective positions of my opponents and myself. I am not a man of science. I am but a humble interpreter of science to the general public. And my every word tonight will have behind it the unanimous assent of all the scientific experts in the world. My opponent represents the minority which, unless he produces some new authority's name tonight, does not include one single professor in the fifteen branches of modern science which are concerned with evolution.

You are, therefore, in listening to Dr. Riley, not listening to an interpretation of a body of experts. You are listening to him posing as an expert, alone, against this unanimous testimony of all the scientific experts in the world on a scientific subject. He has only a few clergymen, one or two medical men, and one or two teachers in religious colleges in America.

This would hardly be an issue to be debated if it were not for the grave situation that has arisen in America.

It is for you of New York to ascertain why whole States in this great Republic have been pledged to exclude from their schools a doctrine which all the scientific experts in the world regard as the most solidly established doctrine of modern science, and the most illuminating idea that the modern man of science uses in his researches.

I need only outline for you those evidences which have convinced all the scientists in the world that evolution is true. I will try to give you a very simple and clear, intellectual outline because I invite you to pass an intellectual verdict on this debate.

Look around the universe and most particularly this earth of ours. For ages we have wondered about the different animals and plants found in different regions. Why have you no lions and tigers in America? Why have you no elephants and camels in America? Extend that over the whole world. What is its meaning? What was the agency distributing the animal and flower population of the globe?

Men of science tell you that there is only one possible interpretation of the actual distribution of living things on this earth. From the centers in which they were evolved they spread right and left as geographical conditions permitted.

I ask my opponent to suggest some other agencies of the distribution of the animal and plant population. I ask him to explain why this distribution coincides in every single detail with what would occur if those animals and plants had come forth by evolution.

I will only give you one illustration on that point. The geologists tell us that millions of years ago New Zealand was split off from the rest of the globe. Geology shows that at that time no animal existed in the world higher than the reptile. What is the present population of New Zealand? Except for animals or plants that can float or fly, there is no native animal in New Zealand higher than the reptile, and that reptile is the most primitive known on this earth. I ask Dr. Riley to explain that.

The geologists tell us that Australia was cut off from the rest of the world at a certain time. The evolutionist finds that at that time there was no animal in the world higher than the kangaroo. There is no native animal in Australia higher than the kangaroo, except such as could float or fly from another region.

(*Continued on Page* 12)

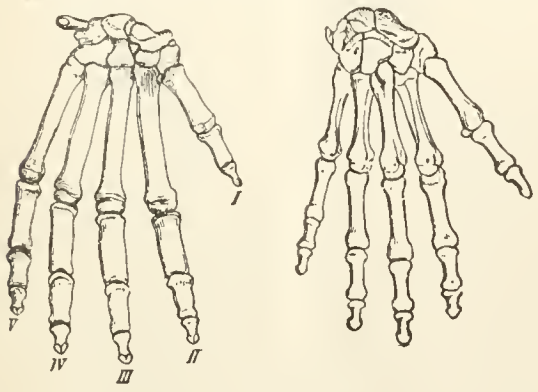
The Origin of Man from the Anthropoid Stem

When and Where?

(From Bicentenary Number of American Philosophical Society's Proceedings, Vol. LXVI, 1927)

By WILLIAM K. GREGORY

THE reduction of the thumb in apes is cited by Professor Osborn as ruling them out from the line of human ascent. But the remarkable feature is, not that apes should have the thumb reduced, but that they should have a thumb at all. No one can doubt, after inspection, that the Chimpanzee has a true hand and not a mere forefoot like that of four-footed animals. (See Figure 1, January EVOLUTION.) Who can now doubt that the thumb of man has not only increased the size but also improved its ability to oppose the other fingers. Professor Schultz states: "In early



Hand Bones of Man and Chimpanzee

fetal life the free thumb branches from the palm immediately at the base of the index finger. In the course of growth this place of branching shifts . . . . . to a place nearer the wrist. . . . . This movement of the thumb, away from the other fingers . . . . . has greatly facilitated the opposability of the thumb. . . . . The opposability of the thumb, which was . . . of greatest importance for the evolution of man, was not yet a feature of the original primate hand. It is significant, but not surprising, therefore, to find that this condition is still lacking in the human embryo. Not only does the embryonic thumb branch at a place unfavorable for effective opposability, but it is not yet rotated around its longitudinal axis to face the other digits."

While the human thumb passed from a stage where it was more nearly parallel to the other fingers to a stage where it can oppose them, the great toe developed in the opposite direction from a stage where it tended to face other toes to a stage in which it parallels them.

It may well be true that apes have ape minds and ape brains, adapted to life in the forest, whereas the Dawn Men (of Java, Piltdown, etc.) had definitely human minds and brains which for thousands of generations had adapted them for life on the plains. But this only establishes the fact that apes and men are different and have been different for a very long period of time. It does not throw any light on the questions whether or not man is an offshoot from the ape stem, what that stem was like, and during what geologic epoch the separation occurred. If we hold with the anti-evolutionists that the human mind has not evolved out of any animal mind, then the labors of the comparative psychologists and neurologists are in vain. But if we accept man as a member of the order Primates and a derivative of some form of pre-human primate, then the evidence of comparative psychology must be taken into account.

What then is the testimony of these comparative sciences? From the labors of Koehler, Kohts and Yerkes it may be asserted that, although far below man in mental ability, the apes are unquestionably much nearer to man than are any of the lower animals of which the mentality has been carefully tested. Indeed, Yerkes, a most cautious and conscientious investigator, finds in the apes more than the rudiments of human thinking. And on the side of the "Dawn Men," Dubois, Elliot Smith, Hunter, Tilney, McGregor, point out the distinctly inferior development of the *Pithecanthropus* (Java man) brain as compared with the brain of modern man, in respect to the filling out of the critical areas which, from clinical research and other lines of evidence, are believed to be the seat of the higher mental faculties. The Pithecanthropus mentality then, while coming within the limits of the human family, was, so far as the brain cast indicates, by no means lacking in lowly traits.

Opponents of the Darwinian view should never refer to the comparison of the brains of apes and man, for there is nothing that so fully testifies to the relatively close kinship of man to the gorilla and chimpanzee, as the field of comparative neurology. The utmost efforts of anti-evolutionists have only brought into clearer relief the basic correspondence in all parts, not only of the brain surface, but of the brain stem of gorilla and man. The ape brain, according to the well-seasoned conclusions of Elliot Smith and Tilney, carries the line of evolution from the lower primates to a definitely sub-human stage. Doubtless the orang is a side specialization in some features, but the gorilla brain stands especially near to the primitive human brain.

All this is in full accord with the evidence from other sources, that the human stock derived a rich heritage from tree-dwelling ancestors, which, while fully erect in posture, avoided the extreme specializations of the existing apes and abandoned the trees before the thumb was greatly reduced or before the body was as heavy as that of the gorilla.

If man is not derived from the primitive ape stock, and yet is to be classed in the order Primates, from what other group did he spring? The tailed monkeys

of the Old World are sharply distinguished from the apes and man by their cheek teeth, which definitely place them as a specialized side line. They also retain the primitive condition of the hind feet, in which the main axis of weight passes through the third toe, whereas in the apes and man it has been shifted to the inner side of the foot. Professor Boule has suggested that perhaps man separated from the Old World monkey stock before the lengthening of the arms and the shortening of the legs in the modern ape group; but in view of the profound agreement of man with the apes in brain characters, blood tests and fetal development, a definitely pre-ape derivation of man lacks substantial evidence. The principal objection of deriving man from a point far down the primate tree is precisely the lack at that early stage of the very numerous characters which connect the human stock with that of the apes.

If the numerous converging lines of evidence for Darwin's view carry conviction to our minds, the next question is, when and where did the separation take place? As to the time when, the separation must plainly have been before Mid-Pliocene times. The preceding millions of years during which the apes were branching out would seem to allow sufficient time for the accelerated evolution when a marked change in food habits, consequent upon the invasion of the plains, caused a higher instability in the ductless gland system. If man is so derived, there is added reason to search for his early representatives in some region of open plains, not too far removed from the ancestral forests of the conservative apes.

Thus, as to place where the human stock began to separate from the primitive chimpanzee-gorilla group, we can reasonably expect to find it somewhere within the known range of the ape group in the Miocene and Pliocene periods, that is, somewhere between Western Europe and Eastern Asia. Here we may refer to the excellent analysis of this question by Grabau and Black, who indicate the region of the Tarim desert in Turkestan as the most likely place in which to renew the search.

Brains—How Come?

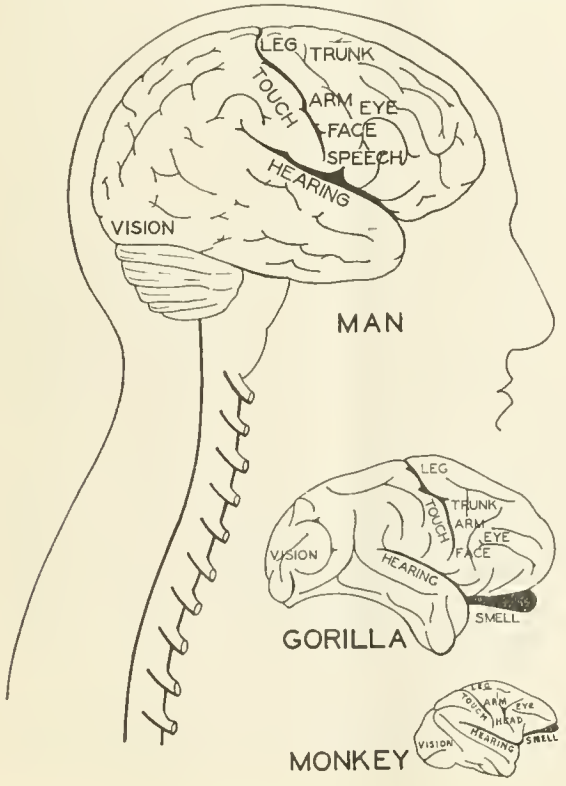
By ALLAN STRONG BROMS

VI

THE brains of man, ape and monkey are alike in shape and working parts. These near relatives of ours look even more alike inside their skulls than outside. Man has put in some recent improvements, but the ground plans are the same.

Viewed from the side, the human front brain looks like a wrinkled boxing glove with padded thumb and knuckles. From above it looks like the fat kernel of a walnut, in two halves and all crumpled up. But it's not a "hard nut" nor solid, its gray working surface being quite soft and thin.

Mapping the working parts of the brain is simple in principle, but difficult in practice. To follow a nerve thread from a brain center to the muscle it controls is some job, but just tickle the brain center and the muscle jerks, spotting the connection at once. The brain surface is just uniformly gray, with nothing to label one part as sight center, a second as touch center, and others for hearing, smell, taste or for control over the various body muscles. But a rap on the back of the head makes you see stars or go blind, the sight centers being located there. Or an inside blood vessel bursts over your ear and your arm is paralysed or your speech gets all mixed up, the centers for the arm muscles and for speech being located close together there.



Strangely enough, the left half of the front brain is connected with the right half of the body, and vice versa. Then right arm paralysis means left brain injury. Most of us, being right-handed, have certain brain convulsions larger on the left, marking the greater skill of our right hands. In left-handed people, this condition is reversed and our early human ancestor (the Java ape-man) is known to have been left-handed because his skull shows these right brain-folds bigger.

Our front brain is in halves because our body is in halves, several of its sense organs (eyes, ears, nostrils and touch) and its arms and legs being paired off right and left. Our eyes today work together and blend their images in the brain, but the eyes of our earlier ancestors worked separately, watching on both sides. Even the most primitive eyes could tell the directions of light or shadow by the relative brightness from the two sides, and right now our ears judge the directions of sounds that way.

So our ape and monkey relatives have brains that match ours part by part. They have more smelling center because they need it more. We beat them, however, in having bigger and better areas for our deep thinking, the so-called "association" centers of our 'high-brow" frontal lobes. In the last million years or so, since we left their ranks, this expansion of the areas in which we put two and two together is our really big achievement. For these association centers, with their added nerve connections, give us our comparisons, judgments and general human wisdom, and enable us to see deeper into the future, six jumps ahead instead of just one.

The next article "That Gray Matter We Brag: About."

Dragons of the Air

By FREDERIC A. LUCAS

WHEN the Mosasaurs were the rulers of the seas, the Pterodactyls or flying reptiles had for ages held the empire of the air. For in the Jurassic, when birds in the shape of Archeopteryx were just beginning to flutter, pterodactyls had long since solved the problem of flight and were present, big and little, in swarms. They must have been particularly abundant about the Solenhofen Sea of Central Europe whose soft, muddy bottom, long ago hardened to rock, furnishes the best lithographic stone, for in this stone beautifully preserved by nature's lithography, many species occur.

Just as Pterodactyls played the part of birds as regards flight, so they seem like the birds to have been creatures of varying size and diverse habits. Some were big as an albatross and sailed majestically over the sea, while others, no bigger than a sparrow, flew merrily over the land in pursuit of insects. There were pterodactyls with long tails, pterodactyls with short tails and pterodactyls with no tails at all. While some flew by day, others, to judge from the size of their eyes, anticipated the owls and flew by night. As to their covering, the evidence and balance of opinion is that unlike most reptiles, they were scaleless. The appearance of some specimens suggested that the wings were covered with small scales or undeveloped feathers, but examination showed them to be only fine wrinkles.*

For reasons unknown they were either sparsely represented in North America during the Jurassic period or their favorite cemetery has not come to light: at any rate scarcely any examples have been found and those in fragmentary condition. But later on, in the Cretaceous, pterodactyls became abundant and in what is now the state of Kansas reached their greatest size in Pteranodon.

In pterodactyls the wing was formed by a membrane stretched between the little finger and the side of the body. But in Pteranodon this "little" finger was nine feet long, the wings having a spread of from fifteen to twenty feet, the maximum reached by any flying animal. The condor and albatross are today the largest flying creatures and they have a spread of wings of from nine to twelve feet, but even this is far under that of Pteranodon.

Structurally, Pteranodon was a marvel of lightness, the great wing bones being scarcely thicker than a sheet of blotting paper, the body little more than an appendage on the wings. For Pteranodon probably did not weigh more than twenty-five pounds, possibly not even that much. Professor Langley was much interested in Pteranodon because not only was it the greatest flying creature but because, as indicated by the limited area for the attachment of wing muscles, its flight was performed with very small expenditure of power. Thus while his model aeroplane, the first that actually flew, required one and a half horse-power for its thirty pounds weight, Pteranodon, it is estimated, used but thirty-six thousandths of a horse-power for the same.

One feature of pteranodon, the extraordinary crest shown in the picture, has been the cause of much argument; for a time it was even a moot question whether or not it had one. Professor Marsh said he did,

Pteranodon, the Giant Flying Reptile

Professor Williston as vigorously said he didn't, and both were right; some had huge crests, some had none, and why they did or didn't no one really knows. To add to the many theories, it is here suggested that the presence or absence of a crest was a sexual distinction, or that it may have served as a counterpoise to the long beak; finally, that it does not seem at all necessary that it should have served any useful purpose whatever, perhaps being a danger signal that the day of the pterodactyl was drawing to a close.

Among the interesting problems concerning the pterodactyl is how he carried himself on land, and having come to earth—or sea—how he got under way again, and what did he do with those enormous wings. For his joints indicate that those wings could not be folded snugly about the body like those of a bat or bird; from their very size some other method was necessary and it would seem that many of these flying dragons walked with wings pointed upward. But there is no more reason to suppose that all pterodactyls, big and little, behaved alike any more than all birds fly, swim or run alike.

Lastly, to repeat an oft propounded query, do pteranodon and the big birds of today mark the limit of size that may be attained by flying creatures, do nature's flying machines stop at a weight of twenty-five to forty pounds? It would seem so.

The American Museum of Natural History and Yale University each have a fine, mounted skeleton of pteranodon, the latter having one of the few pterodactyl specimens showing the imprint of the wing membrane. The finest European collection is in Munich.

*(Note:—Prof. Broili of Munich has just described a specimen covered with fine hair, or at least, hair-like structures.)

The Earliest Men

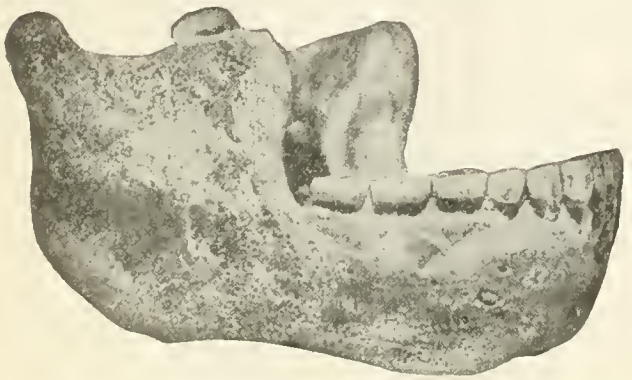
By EDWARD GRIEG CLEMMER

IN 1891, Dr. Dubois, a Dutch army surgeon stationed in Java, was hunting for fossil remains of prehistoric animals along the Bengawan River. On a sandy shelf he found a tooth not entirely human, yet not wholly ape-like. Some weeks later he found a skull-cap at the same level but more than a yard away. Next year a thigh bone and another tooth came to light, the thigh bone some fifty feet nearer the river. These four specimens were all at the same level and nearly in line. In 1907 and 1908, Madame Selenka made an expedition to the island, searched very carefully, but found only one more tooth.

From these five remnants: a skull-cap, a thigh bone and three teeth, scientists have reconstructed a creature about half way between the ape and man. It may seem absurd to reconstruct an entire man from such fragments, but the methods warrant the conclusions reached by the experts. The skull-cap tells a great deal about the enclosed brain and indicates the creature's intelligence. The teeth tell something of the character of the jaw and of the food the possessor ate. The smooth end surfaces of the thigh bone in contact with the hip socket and shin bone help to decide the angles at which the bones were placed and therefore whether the creature stood erect, as does man, or slouched, as does the ape.

The skull-cap has a very marked ridge over the eyes, a sloping, narrow forehead and a brain capacity estimated at about 985 cubic centimeters. The capacity of an adult male gorilla is 550 cubic centimeters and the African bushman, a very low type of present man, 1240 cubic centimeters. The thigh bone indicates that the Java man walked erect and freely used his hands. In view of the primitive skull and the erect posture, the creature was given the scientific name "Pithecanthropus erectus," the erect ape-man.

After the ape-man period comes a great gap of hundreds of thousands of years while the earth was in the icy grip of the first and second glacial ages. Then the ice withdrew and warm weather returned, with an abundance of plants and animals. The time was again ideal for mankind. From this period we have recovered one human jaw, buried 82 feet below the surface in a sand pit six miles southeast of Heidelberg, Germany, whence its name, the Heidelberg jaw.



Fossil Jaw of Heidelberg Man

Perhaps its most striking characteristic is the lack of chin. Were not the teeth conclusively human, it could well have been taken for the jaw of an ape.

The next important find is the Piltdown skull. The English anthropologist, Charles Dawson, walking down a Sussex road, noticed that some fresh earth contained brown flints not common in that part of the country. He traced them to a gravel bed and warned the workmen not to throw away any bones they might find. When later, a workman showed him a broken human skull bone, he searched carefully, but found no others. But in 1911 he found part of the forehead and the ridge over the right eye. Then, in the spring of 1912, with Dr. A. Smith Woodward of the British Museum, he made a systematic search, even sifting the loose earth for small fragments. They were rewarded with more skull parts and the broken right lower jaw.

Restored Skulls of Java Ape-man and Piltdown Dawn-man (Dark parts found; light parts restored)

The skull, when pieced together, was very peculiar and excited much controversy. All agreed that the skull was humanly modern, but differed as to the jaw. For the jaw was very primitive and the experts could not understand why it had not developed in proportion to the skull. Some thought it the jaw of a chimpanzee and even gave this new species of ape a name. Every scientist qualified to judge considered and debated the evidence. After a virtual "ordeal of fire," in which every scrap of evidence, both pro and con, had been carefully weighed by the most competent men in the world, remains of a second individual came to light, indicating that the fragments were of one individual.

The cranial capacity of the skull was set by Woodward at 1070 cubic centimeters. The brain case was thick, but the forehead much higher than that of the Java man, even higher than that of the Neanderthal race which came much later. However, from a study of the cast of the brain cavity, G. Elliot Smith, a high authority, concludes that the brain center in control of articulate speech was but feebly developed. He was "Eoanthropus," a true "dawn man." His skull marks him as ancestor of man, but his jaw shows that he was not yet full fledged.

We have seen that the Java man stood on the border line between the ape and man, that the Heidelberg

man developed further, but was still very much an animal, while the Piltdown man stood at the very dawn of the human day. The stage is set for the appearance of true man, well started on his long, upward journey to the exalted state we occupy as "Homo sapiens," the Wise Men.

This is the second of four articles by Mr. Clemmer on The Ancestors of Modern Man, the next being on The Neanderthal Race.

Mammals That Lay Eggs

By MAYNARD SHIPLEY

EGG-LAYING is usually thought of only in connection with birds and reptiles. But at the antipodes we meet with queer creatures which possess some characteristics of both reptiles and mammals. When specimens of these paradoxical animals were first taken to England, they were forthwith pronounced a fake, on a par with the composite "mermaids" exhibited in those days.

Exploring in southern Australia, one might come across a strange creature known locally as the "duck-bill mole"—a specimen of one of the two distinct families of these curious egg-laying mammals — an animal about a foot and a half long, with a broad, shovel-like snout, strongly resembling a duck's bill. The feet are webbed, but differ from the duck's in having five toes, armed with sharp claws. But the body is well covered with soft dark-brown fur. Frequently the creature may be seen in a sitting posture, supported partly by its large, flat tail.

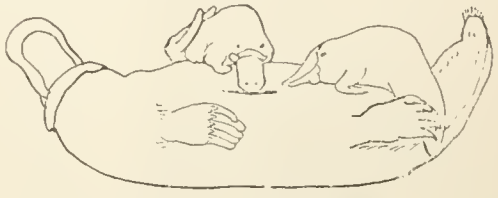
The duck-bill is a timid beast, and must be approached very cautiously. Watching its movements, one may see it fill its cheek-pockets with food—chiefly water-snails and bivalves—and then dive into a pond. But it does not come to the surface again, even to take air, though one wait patiently an hour or more for its reappearance. Yet no lung-breathing fresh-water creature can "hold its breadth" for so long. Where can the queer mammal be?

At last the secret is out! Mrs. Duck-bill *(Ornithorhynchus)* has gone to her burrow to lay an egg. Fancy a mammal with soft brown fur going home to lay an egg! But surely she does not lay her eggs under water! She does not. But the entrance to her "one-room apartment" is below the water-line, safe from all intruders. Entering her water-hidden burrow, Mrs. Duck-bill passes through a tunnel which slopes gently upward for a distance of 25 to 50 feet, where there is a rather large chamber with top ventilation, lined with reeds and rushes. Here in a comfortable nest of soft grasses she lays her two or three eggs, less than an inch long, with flexible, parchment-like shells—of reptilian, rather than bird-like, character.

The eggs are incubated, as in the case of birds, by the body-heat of the mother—such as it is. For curiously and suggestively enough from the standpoint of evolution, the body temperature of the *Monotremata* (to include all the species of this order of mammals) is intermediate between the cold-blooded reptiles and the "regular" warm-blooded mammals; and, as in the case of reptiles, the body temperature changes to the extent of some 25 degrees Celsius with the rise and fall of the atmospheric temperature. This is in agreement with the theory of many zoologists that the *Monotremata* of today are the somewhat modified descendants of the transition type of animals leading from mammal-like reptiles to reptile-like mammals, thence to a generalized type of the monotremes, on to the pouched animals (Marsupials), and through the latter to the true (Placental) mammals.

After this glance backwards, to a period some two hundred odd millions of years ago, when egg-laying mammals first came into being, let us return to the burrow of Mrs. Duck-bill of today.

Having hatched her family of two or three lusty



Mrs. Duck-bill Serves Dinner

duck-bills, from her reptile-like eggs, what next? Will these youngsters follow the example of all other orders of egg-laying animals and begin to "pick up" a living for themselves, like a new-born chick or an infant reptile?

The little ones are born with a perfectly good set of teeth, whereas mother duck-bill's dental equipment has disappeared, giving place to broad, horny plates, which line the inside of the "bill." And here is where evolution comes in again—for the original *Monotremata*, whose fossil remains are found in the Triassic rocks, are provided with teeth, even in the adult stage, similar to the teeth of an infant duck-bill today. This is in accord with Haeckel's "biogenetic law."

Anyhow, though hatched from an egg like a reptile, the queer little duck-bills are mammals, after all; and the infant mammal feeds on mother's milk. And these strangest and most paradoxical of all mammals form no exception to the rule. For though mother duck-bill has no true mammary glands—representing as she does a stage in evolution prior to the appearance of true mammals—she is nevertheless provided with modified oil glands which in primitive fashion perform the same useful function. These glands, buried deep in the abdominal hair, secrete real milk, through a sieve-like aperture. Eventually, the "milk-teeth" of the growing youngsters are worn off, and are replaced by plates, "just like Mamma's."

There is another family of these strange egg-laying mammals, the Echidnas, both in Australia and New Guinea, covered with quill-spines instead of fur. But that is another story.

EVOLUTION

A Journal of Nature

To combat bigotry and superstition and develop the open mind by popularizing natural science

Published monthly by
EVOLUTION PUBLISHING CORPORATION
96 Fifth Ave., New York, N. Y.
Tel.: Watkins 7587

L. E. KATTERFELD, *Managing Editor*
ALLAN STRONG BROMS, *Science Editor*

Subscription rate: One dollar per year
In lists of five or more, fifty cents.
Foreign subscriptions ten cents extra.
Single copy 10c; 20 or more, 5c each.

Entered as second class matter at the Post Office at New York, N. Y., January 7, 1928, under the Act of March 3, 1879.

VOL. II, No. 5 APRIL, 1929

IN DEFENSE OF HONESTY.

Your fundamentalists claim all the virtues and charge the scientists with the most malevolent intentions. But I know many scientists and I find them kindly of intention and most honest in attitude. None that I know have dire designs on youth or morals.

But I have recently read some books of "fundamentalist science" and now wonder at the nerve of these who proclaim their own virtues. For it is not ordinary honesty to distort meanings and argue jesuitically, even for the glory of your god, and these things they do. It is easy to quote from diffident and honest Charles Darwin when he considers the whole case, the doubts alongside the proofs. It is easy to ignore the overwhelming proofs and to magnify the doubts most plausibly. You can cleverly alter his plain meanings and so force unmeant confessions from him. But you cannot so win any respect for your honesty.

I prefer the scientific attitude, the attitude that seeks earnestly, without thought of consequences, that makes no pretence to knowing all, and modestly talks not at all of its virtues, yet scorns those who withhold or tamper with actual evidence or who permit bias or preference to color their utterance. For honesty, give me your scientist; for craven subversiance to prejudice, your fundamentalist. A. S. B.

EXPIRED?

If YOU started with No. 1 of EVOLUTION, your subscription has now expired, unless you renewed. Better renew right away, lest you forget. And still better, send the subscriptions of at least four friends along with your renewal. Remember that in lists of five or more we accept yearly subscriptions at fifty cents each.

RILEY SEEMS A LITTLE RILED.

The fact that the New York audience voted against him almost unanimously after his recent debate with Professor Joseph McCabe seems to have riled our Reverend Doctor Riley somewhat, judging from the tone of his remark regarding the audience (which we reprint under "Funnymentals" where it belongs) and the amount of space he again devotes to the subject in the April number of his magazine.

He consoles himself with the vote of the judges, but does not mention the fact that of the sixteen judges placed on the list by EVOLUTION only twelve were present, all of whom seem to have voted for Professor McCabe, and that instead of limiting his own list of judges to an equal number, as agreed, seventeen of his fundamentalist friends were seated because the EVOLUTION committeeman did not happen to be present at the moment. Naturally his seventeen friends voted for Riley, and he is welcome to whatever consolation this means to him.

We are printing the stenographic record of the debate in full in EVOLUTION, so that our readers can judge both arguments for themselves. We offered to let Dr. Riley have the record for simply his share of the expense of transcribing it. He refused. We now challenge him to print the entire stenographic record of this debate in his magazine, so that his readers also can judge the arguments, instead of merely his biased reports of the matter. Let the Reverend Doctor "put up or shut up."

WOMAN REARED BY APES

The newspapers carry the following story:

"An explorer invaded a colony of apes in the wilds of Africa. The apes promptly took to the trees and disappeared, leaving behind one apparently less nimble than the rest. This proved not to be an ape at all, but a negro woman, whose body, unlike those of the rest of the negro population, was free from tatoo marks. The explorer learned that she had been stolen by the apes in infancy and brought up among them."

If the story proves true and this woman learns to speak and so communicate her experiences, we should get a most interesting picture of the intimate life of these jungle folk.

HAIL STREET SPEAKERS.

On these balmy spring evenings every street speaker worthy of the name feels the urge within him to make the welkin ring with his message. EVOLUTION sells like hot cakes at street meetings. I'll stake you to a bundle of twenty so you can try it out. Let me hear from you instanter. L. E. K., care EVOLUTION.

N. Y. EVOLUTION DINNER FRIDAY, APRIL 26th.

The Evolution Anniversary Dinner in New York has been postponed to Friday, April 26th, and will take place in the beautiful Pythian Temple, 135 West 70th Street, beginning at seven o'clock.

Miss Grace Potter will be Toastmistress. Among the speakers will be Chard Powers Smith, George Clyde Fisher, Abraham Stone, Allan Strong Broms, Frank A. Sieverman, Moses Oppenheimer and Arthur Garfield Hays.

At this Dinner plans will be announced for a tremendous campaign for the second year of EVOLUTION. Every reader who can be in New York, April 26th, should of course attend this important celebration and bring some friends. Many out of town readers are expected to send suitable "birthday greetings" to be presented at this New York Dinner to EVOLUTION.

The rate is three dollars, including the Dinner. Tickets for the speaking only may be had at one dollar. Reservation should be made at once at the office of EVOLUTION.

BROMS LECTURES.

The course of five illustrated lectures on "EVOLUTION: FROM STARDUST TO BRAIN-STUFF" that Mr. Allan Strong Broms, science editor of EVOLUTION, has just given in New York proved such a great success from an educational as well as financial standpoint that arrangements will be made to give similar lectures weekly throughout the season, beginning in September.

The subjects of the lectures already given were: 1. Worlds in the Making; 2. The Earth's Coming of Age; 3. Animals of the Past; 4. The Pedigree of Man; 5. Brains—How Come? A special lecture is announced for Friday evening, April 12th, on "The Royal Road to Learning," at Union Auditorum, 229 W. 48th Street, New York City.

Organizations in Eastern cities that would like to avail themselves of Mr. Broms services as science lecturer next winter should make immediate application.

AN OPTIMIST

"Evolution," quoth the monkey,
"Makes of all mankind our kin.
There's no doubt at all about it,
Heads—they lose, and tails—we win."
(Author not known.)

LET'S SEND YOU A BUNDLE.

The McCabe-Riley Debate, starting in this issue, will be completed in three numbers of EVOLUTION. For a dollar bill we'll send you five copies of each issue containing the debate as it appears. Let us send you a bundle and get your friends to reading. That's the best way to convince the doubting Thomases.

OVER FIVE THOUSAND SUBSCRIBERS.

With the twelfth issue EVOLUTION achieved over five thousand individual paid subscribers. This gives cause for congratulation to every friend of EVOLUTION, who during this year has helped to build up this list by sending new subscribers. It augurs well for the future of EVOLUTION. Doubling the list once more will give the necessary circulation to make EVOLUTION a self-sustaining enterprise.

Here's how it looks by States:

Alabama	20	New York State	494
Alaska	2	New York City	675
Arizona	26	North Carolina	29
Arkansas	56	North Dakota	46
California	551	Ohio	299
Colorado	83	Oklahoma	32
Connecticut	32	Oregon	90
Delaware	12	Panama	1
D. C.	43	Pennsylvania	159
Florida	34	Phillipines	2
Georgia	16	Rhode Island	9
Hawai	11	Porto Rico	2
Idaho	8	South Carolina	20
Illinois	486	South Dakota	58
Indiana	50	Tennessee	27
Iowa	22	Texas	67
Kansas	85	Utah	55
Kentucky	22	Vermont	2
Louisiana	6	Virginia	24
Maine	12	Washington	182
Maryland	58	West Virginia	10
Massachusetts	147	Wisconsin	66
Michigan	256	Wyoming	9
Minnesota	145	Canada	141
Mississippi	4	Other countries	150
Missouri	120		
Montana	24	Total	5184
Nebraska	42		
Nevada	1	Bundles sold on consignment	2528
New Hamshire	9		
New Jersey	141	Grand total	7712
New Mexico	11		

This circulation is being achieved by the volunteer efforts of our readers. Those who have sent five or more subscribers since our last report two months ago are listed in this

HONOR ROLL

16	S. Lauderdale	6	O. J. Schuster
15	A. W. Bell	6	Frank Doster
13	Ruth Orange	6	Irving Miller
13	B. Sandman	6	C. J. Goetz
12	Claude Scott	6	W. J. Lockhart
11	I. D. Cardiff	6	M. A. Stolar
11	George Koop	6	Hy. Scharlock
10	L. A. Drew	6	Wm. Myerson
9	G. Elfernick	6	V. Coleman
9	I. W. Howerth	6	Ches Swingard
8	J. DeRose	6	F. J. McNey
7	Fred N. Weiss	6	Emil Falk
7	Geo. K. Spahr	6	Fred Blossom
7	W. R. Green	6	J. C. Keegan
7	A. I. Urquhart	6	V. M. Tanner
6	C. R. Peterson	6	F. Wheeler
		6	Smith Bk. Co.
		6	A. Chernay

Five from each of the following: R. B. Wilson, Thos. L. Brunk, F. H. Harris, E. L. Prizer, A. M. Gilbert, Alfred Langer, Henry Caldwell, M. A. Hanna, E. G. Clemmer, Alvin Haug, W. F. Copeland, Frank Hart, Floyd Ramp, H. S. Warren, Ray S. Knorr, W. H. Draper, Chas. F. Clagg, F. W. Adsit, G. H. Miller, John Swanson, M. T. Skjolaas, A. H. Candee, Fred Burger, F. Hall Childs, Erma Lee, Richard White, Carl M. Decker.

What these have done, YOU can do. Show this issue to some of your friends. Let us have at least a list of five as birthday greetings, and make next Honor Roll.

OVER THE TOP.

The Five Thousand Dollar Promotion Fund has gone over the top, thanks to the splendid co-operation of the following friends, each of whom has contributed the specified amount since last report:

S. Lauderdale, $2.00; Charles R. Peterson, $1.00; J. E. Vojan, $5.00; Albert I. Elkus, $1.00; R. H. Jenkins, $5.00; W. J. Lockhart, $5.00; Junius Henderson, $2.00; George E. Coleman, $20.00; John Brezovsky, $5.00; John B. Henck, $1.00; Chas. P. Sigerfoos, $1.00; L. E. Trainor, $1.00; Tobias Sigel, $10.00; Caspar W. Hodgson, $5.00; Allan Strong Broms, $10.00; Wm. H. Seamen, $1.00; Robert E. Lee, $50.00; L. T. B. Light, $300.00; M. M. Cox, $11.00; J. W. Beede, $1.00; A. L. Herrera, $1.00; Mr. and Mrs. A. E. Comes, $2.00; Martin Dewey, $300.00; A. Berthelot, $2.00; John Dewey, $3.00; Josep Llord, $2.00; Mrs. Ellen R. Nagle, $5.00; M. Mark, $60.00; Wm. H. Whittekin, $35.00; Evangeline W. Young, $2.00; Cecelia Silk, $3.00; Charles Fuchs, $5.00; F. R. Burnham, $3.00; R. Abrahams, $10.00; Joseph Kovar, $10.00; Chas. W. Rappold, $10.00; Frances Pilat, $50.00; Caro L. Strobell, $3.00; Michael A. Cohn, $10.00; Arthur Garfield Hays, $10.00; Chas. A. Severance, $1.00; F. A. Sieverman, $10.00; Leo Turbow, $12.00; Emil Falk, $3.35; A. A. Brill, $10.00; N. W. Lermon, $1.00; Mignon Talbot, $14.00; W. B. Palmer, $.50; Henry L. Gonor, $1.00; Wm. Floyd, $25.00; Watts and Co, $1.40; Total, $1,042.25.

Previously reported paid, $2,210.00; Pledges, $1,800; Grand Total, $5,052.25.

A journal whose friends give such evidence of their support during the first year of its existence can look toward the future with confidence. Our Promotion campaigns for EVOLUTION will be made in proportion to the funds provided by readers. For every dollar contributed at least twenty copies of EVOLUTION will go out into the world. We hope that there will be such a response on the occasion of our anniversary this month, that the field of usefulness for the coming year will be multiplied manifold.

WHY NOT JOIN US?

Wouldn't you like to join us in this enterprise of enlightenment? Our immediate business is publishing this journal, EVOLUTION, and selling books. Later we shall develop a Lyceum Bureau for touring natural science lecturers.

Additional capital is needed to push circulation campaign for EVOLUTION. For this purpose Evolution Publishing Corporation offers its $10 shares of preferred stock, and gives one $10 share of common, voting stock with every block of five shares subscribed this month.

It is expected to make the business pay, but shareholders are not invited with the promise that they will "get rich," but because of their interest in furthering this educational work.

Checks should be made payable to EVOLUTION PUBLISHING CORPORATION, and you should specify whether payment is in full, or whether it should apply on a larger block of stock to be held until balance is paid.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., required by the Act of Congress of August 24, 1929, of "Evolution," published monthly at New York, N. Y., for April, 1929.

State of New York,
County of New York
ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared L. E. Katterfeld, who, having been duly sworn according to law, deposes and says that he is the Managing Editor of the "Evolution," and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher: Evolution Publishing Corporation, 96 Fifth Ave., New York, N. Y.; Editor, none; Managing Editor, L. E. Katterfeld, 96 Fifth Ave., New York, N. Y.; Business Manager, L. E. Katterfeld, 96 Fifth Ave., New York, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Evolution Publishing Corporation, 96 Fifth Ave., New York, N. Y.; L. E. Katterfeld, 96 Fifth Ave, New York, N. Y.; Martin Dewey, 17 Park Row, New York, N. Y.; M. Mark, Swayzee, Indiana; A. Nielen, Los Angeles, Calif.; Wm. K. Gregory, 136 West 77th Street, New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

L. E. KATTERFELD, Mgr.

Sworn to and subscribed before me this 3rd day of April, 1929.

JOSEPH R. BRODSKY.

(My commission expires March 30, 1930.)

Our Face from Fish to Man

Our readers will be glad to hear of the publication of Dr. Wm. K. Gregory's new book, "Our Face From Fish to Man." In Addition to a review by Dr. Horace E. Wood, Jr., of New York University, we reprint below Dr. Gregory's own preface and the foreword by Wm. Beebe.

"OUR FACE FROM FISH TO MAN," by William K. Gregory. 295 pages, 118 figures. G. P. Putnam's Sons, New York. $4.50.

It seems hardly necessary, nowadays, to identify Dr. William King Gregory as Professor of Vertebrate Paleontology at Columbia University, and Curator of Comparative Anatomy, Curator of Ichthyology, and Associate in Vertebrate Paleontology and in Physical Anthropology at the American Museum of Natural History. It is a logical assumption that Dr. Gregory would be the universal choice as the individual best qualified by training and ability to write such a book—and the result certainly accords with such a prediction.

The subtitle, "A Portrait Gallery of Our Ancient Ancestors and Kinsfolk, Together with a Concise History of Our Best Features," gives only a hint of the treat in store for the reader, whether technically trained or not. The wealth of magnificent illustrations (in large part drawn from Dr. Gregory's own work) almost tell the story in themselves. They are reinforced by a text that is always accurate, always readable, and sometimes distinctly sprightly. It would be no reproach to so excellent a book to be simply a compilation of other men's results; but a surprising portion of the book rests on the original work of Dr. Gregory himself, and he has focussed a large part of the remaining material into a new synthesis. Mr. William Beebe contributes a characteristic foreword.

Although the title specifically disclaims such broad inclusiveness, this book comes closer to being an adequate modern treatment of vertebrate evolution than any other book on the market.

Science moves forward, most of the time, by detailed studies of minute points. Finally, the layman, the student, and even the specialist, find themselves oppressed by the dead weight of a mass of unassimilated detail. Then some analytical mind brings order out of chaos, and everyone says, "Why, of course, it couldn't be any other way." For such a synthesis, we are now indebted to Dr. Gregory

"Wholly ignorant of the facts, the ancient Jewish priests indulged themselves in the fancy that man was made in the image of God; but modern science shows that the god-like mask which is the human face is made out of the same elements as in the gorilla; and that in both ape and man the bony framework of the face is composed of strictly homologous elements, inherited from a long line of lower vertebrates." (P. 91.)

—Horace Elmer Wood, 2nd.

WILLIAM KING GREGORY

PREFACE

According to popular standards of civilized peoples, men of one's own race and tongue were called "men," "warriors," "heroes," but people of other races were "barbarians," "unholy ones," "foreign devils." The founder of one's own clan was often considered to be the son of a deity, while the barbarians were the descendants of monkeys or other wild animals. Or the first man was created perfect, in the image of God. One's own family, of course, was fairly true to type but sin had played havoc with the features of other races. To believe all this was comforting to one's own "face" in a world where the inferiority complex occasionally haunted even kings.

Imagine then the effect of telling one-hundred per cent Americans that they are not the descendants of the god-like Adam but are sons and daughters of *Dryopithecus*, or of some nearly allied genus of anthropoid apes that lived in the Miocene age—and that before that they had long tails and ate grubs and beetles!

If the reader is curious to know the worst he will find it in these pages. There even his own great-grandfather — a Jove-like patriarch with ample beard, piercing eyes and an aquiline nose — will be subjected to unsparing analysis. It will be shown how much the proud old gentleman was indebted to a long line of freebooting forebears that struggled for a precarious living in the sea, on muddy flats, on the uplands or in the trees — aeons before Adam delved or Eve span. In detail it will even be charged that the real founder of the family was not the powerful settler to whom the king gave a grant of land extending far back from the river, but a poor mud-sucking protochordate of pre-Silurian times; that when in some far-off dismal swamp a putrid prize was snatched by scaly forms, their facial masks already bore our eyes and nose and mouth.

Accordingly, this little book can hardly expect much popularity either in Tennessee, where the very idea of evolution is anathema, or in the metropolitan strongholds where pithecophobia is still prevalent and man's complete superiority to the all too man-like apes is somewhat nervously stressed.

Nor can the author hope for much favor from the public, that wants only results and is willing to spend a billion dollars annually on cosmetics and safety razors. For this book does not pretend to tell how to improve one's face but only how and why one has one.

At best then it can only hold a magic mirror up to proud man and bid him contemplate his own image — a composite of an infinitely receding series of faces—human, prehuman, anthropoid, long-snouted, lizard-like — stretching back into the shadows of endless time. W. K. G.

FOREWORD

By WILLIAM BEEBE

A foreword to a volume such as the present one of Dr. Gregory's is as superfluous as would be the retention of the third eye, the Cyclopean one, of our ancestors, in the center of our forehead today. No more wonderful subject for a volume could be imagined than the evolution of the human face, and no more competent author than William K. Gregory. The result seems to me eminently satisfactory.

If the reader's interest is real but cursory, let him do nothing but look at the illustrations. They will ensure a thousand per cent interest to every walk along Fifth Avenue or Regent Street. If pressure of other interests permits only an hour's perusal, or complete lack of natural history knowledge requires facts to be strained through the mesh of popular language, read but the preface and the first few paragraphs of each chapter. Taken as a whole this is not a "popular" book in the sense of a superficial one. The details of evolution of our eyes, ears,

The Amateur Scientist

A Monthly Feature *conducted by* Allan Strong Broms

Spring Flowers

"The flowers that bloom in the spring,
tra la,
Breathe promise of merry sunshine."

BUT not for themselves. For soon the trees above will be putting out dense thickets of leaves to cast deep shadows below. Light means life in the plant world and shadow death. So many of the smaller plants have solved the problem by beating their tree neighbors to it in the spring, shoving their leaves up quickly before the tree shadows thicken.

Skunk Cabbage. Symplocarpus fœtidus

They live briefly, but completely. By braving the spring chill, they manage to show their flowers, get them fertilized and so accomplish the important work of getting the next generation well started on its way, all before the slower trees have put out their foliage for the summer. This duty to the future done, they shrivel away into inconspicuousness. They are in such a rush about it all that one hardly realizes spring has come before they appear and quickly pass away.

Thus the spring flowers, besides promising summer days and providing poets with sweet subjects, exemplify such celebrated virtues as seizing time by the forelock, doing today what would be too late on the morrow and practicing the rule of early to bed and early to rise. This virtuous tribe is quite numerous, but just look for these: Skunk cabbage, False Hellebore, Adder's tongue, Trillium, Rue anemone, Bloodroot and Jack-in-the-pulpit, all well matured before the ordinary plants have started in.

First of all, usually, is the Skunk cabbage. Being such an early plant, it wraps itself cozily to keep warm. Besides, it makes friends with certain little flies that venture forth while the air is still chilly by providing them with warm shelter within its wrapper of leaves. In return, these flies bear the plant's pollen from flower to flower and so effect the fertilization which starts the seeds growing. You wonder where the flower is, for there are no colored petals. The working parts are there all right, colors being but a lure, replaced in this case by a strong odor, attractive to the flies, but disagreeable to us, whence the very descriptive name "skunk cabbage."

Jack-in-the-pulpit lures the pollen-bearing insects with color and sweet nectar in its flower. But it wants only those that fly, for crawling insects make slow progress between plants and knock about so much on the way that they lose and waste the precious pollen. So Jack, despite his pious pretensions, traps and kills the creeping wastrels, while letting the flying kinds come and go. The inner walls of his pulpit are slippery and impossible to climb. Only the flying insects make their way out and this is quite as the plant would have it.

To effect the quick spring growth, the Bloodroot and many another spring flower lays in a food reserve in rootstock, bulb or tuber.

THE BLOODROOT AND ITS FOOD-STORE

A kindred group of flowers is exemplified by the Crocus of our spring fields. Its problem is not that of avoiding summer shadows, but of escaping the choking summer growth of grass and weeds. So it too comes out early, lives its brief life and quickly goes back to rest through the seasons of summer crowding and winter freezing. Out in the open, exposed to cold winds and late frosts, it has developed a warm coat of fuzzy hair, enabling it to brave the spring chills a bit earlier than its plant rivals.

So even the flowers are engaged in a bitter struggle for existence in which chance variations of structure or habit which favor survival are preserved by natural selection, thus causing evolution towards forms and ways better fitted to meet the problems of their environment.

---

nostrils, mouth—these are too delicate, too intricate for words of one syllable. Yet to read and understand this volume requires no more concentrated attention than the remembrance of the highest diamond in the ninth trick, or to what Steel Preferred fell in the Autumn of 1914.

I advise no Fundamentalist or Anti-Evolutionist to read it, for if he have no sense of humor he will not understand it, and if he have, his belief will be like Dunsany's King who "was as though he never had been." If with Bergson we believe that the origin of laughter was cruelty, then an S. P. C. to something should be formed to prevent the spectacle of a Fundamentalist's face functioning with the third eyelid of a bird, the earpoint of a deer, the honorable scars of most ancient gills, and with his lip-lifting muscles in full action as he sneers at truth. A moment's thought of these few characters presents a new viewpoint on what we are wont to call the "lower" animals, for if our third eyelid were more than a degenerate flap we, like an eagle, could look straight at the sun; if our ears could straighten and turn as once, the lives of pedestrians would be safer; if the ghosts of gills were still functional, drowning would be impossible, and if the fang-revealing sneer showed less degenerate canines, we might have a more physically wholesome fear of cavilers against the doctrine of Evolution.

The impregnable array of facts gleaned through the centuries of man's intellectual supremacy proves beyond all question the gradual rise toward human perfection of the various components of the face, and this confirms our precious organs of sense as most noble gateways of the human mind and soul. Kindness, gentleness, tactfulness, patience, can flow out through only these channels. It is a worthy thing to have written a book about them; it is a fortunate chance to be able to read it.

McCabe-Riley Debate

(Continued from Page 2)

I could run over the whole of the earth and point out that wherever you find an island population, if that island is a detached fragment of the main land, the animal population came from that main land. In every part of the earth animals and plants are distributed without one single exception precisely as the law of evolution demands. I want an alternative explanation not only of the distribution, but most particularly of the exact coincidence of that distribution with the theory of evolution.

Then I turn to the animals themselves. Why has the python the rudiments of legs and claws in its body? Why has the bird the rudiments of toes on the corner of its wings? Why has the whale vestigial limbs and leg bones in the flesh?

I could wander over the whole animal world. If those animals evolved, we understand it, for organs which are thrown out of employment gradually decay. Over and over again, we find that those organs were useful in an earlier generation. We find hundreds of such evidences in the animal world. I want an alternative explanation for that.

We turn to man. Why, there are in the body of man alone fifty or sixty useless organs or parts of organs which cannot be explained by any theory except evolution. These bits of gristle on the side of your head, your ears, will refute all the anti-evolutionists in the world. No one can tell us that medical men cannot say whether these are useful or not. They are useless With these fifty or sixty useless organs in the human body today we do not need to find one single bone or one single stone of early man. We need only one living human body, and I defy all the anti-evolutionists of America to interpret that body on any lines except those accepted by evolution.

Thus two lines of evidence coincide. And if the story of evolution is true, somewhere in the rocks underneath your feet you will find the bones of the ancestors of the animals and plants of today. We open up the rocks of the earth just here and there, just in little tiny scratches, as it were, but we have dug out literally millions of remains of animals and plants of long ago.

I ask Dr. Riley to tell me of one of those remains that is inconsistent with the doctrine of evolution.

I say that we have rarely opened up the rocks. But there is one seam of rock which we are vigorously exploiting all the world over. I mean our coal seams. Will Dr. Riley tell us why we have never found in any coal seam in the world any bone of any mammal, any flowering plant, any bee, any ant, any wasp? The entire life of that great formation is familiar to us. Why has no geologist ever found in it a trace of any animal higher than the amphibian?

Why, beneath the level of the chalk—and you know the greater part of Europe lies level like a billiard table—why, beneath that chalk have we never found the bones of one single animal even remotely resembling the animals of today?

The order of the rocks was determined more than one hundred years ago, long before any geologist in the world entertained the idea of evolution. Why, when we started the idea of evolution, was it found that the millions of fossils in those rocks corresponded without one single exception to the theory of the evolutionist? Or if there is an exception, let us hear of it tonight.

Those are three lines of evidence, the coincidence of which requires a serious explanation. I assume that it is universally true, without a single exception. It is up to my opponent to give you exceptions. But I am not finished with those three lines.

Many of you have seen a mountainside. You have seen the seams of rock twisted and torn as by some convulsive force. Does anybody imagine that they were created in that condition? Surely, they point back to some long period of time in which the sands were laid down on the floor of the sea and later pressed into that solid condition you find today. Thus the earth itself tells you of evolution, which the geologists have known for years to run into hundreds of millions of years.

Then comes another science just at the last moment. Decade by decade the proofs have accumulated. Some time ago we discovered the wonderful elements thorium and uranium, breaking up and turning into lead. Scientific men said: "We know how long it takes uranium to turn into lead, so let us test the chronology of the earth." Once more this new line of research, the most magnificent trial of physical science—said: "Those rocks run back to something like more than one billion years from the present time." One more triumph for evolution. And nothing has transpired that is in the slightest degree inconsistent with evolution.

Why is our earth in the condition in which it is today? Why is Mars so much colder and so much thinner in atmosphere than the earth? Why is the moon the dead, frozen world that we know it to be today? Why does our earth come between them? Why does the sun remain that mass of boiling vapors that it is today? Every single feature of every single body of our solar system corresponds perfectly with the theory of evolution.

When I look out over the great universe, this massive system of two billion stars that we know today, once more every object in the universe teaches evolution to us. There are the giant red stars, the young stars, the imperfectly condensed masses of matter rising in temperature. There are stars packing closer and closer, getting hotter and hotter. There are blue-white stars tens of thousands of degrees in temperature and then, going down the scale, dying suns down to the dull, blood-red star that once shone white in the sky billions upon billions of years ago.

Not only on the earth, but from end to end of this universe which we sweep with mighty telescopes, there is not one single object inconsistent with the doctrine of evolution. There are myriads of objects, but there is not one single thing in this universe that is inconsistent with the doctrine of evolution. There are two billion human beings. There are two billion stars. There are billions of animals and plants, and all of

them are not merely consistent with, but most eloquent examples of the doctrine of evolution.

Those are the reasons why, for the last twenty-five years, there has not been one man of science who doubted evolution. Seventy years ago Charles Darwin gave out this doctrine to the world. You know the controversy. Ten years later ten per cent of the scientific men of the world were evolutionists. Twenty-five years ago the last scientific man died who questioned evolution. And there is not an expert of the fifteen branches of sciences today who will not tell you that it is one of the most solid principles we have in modern science. Its basis is the universe, and the mark of evolution is stamped upon every particle in that universe.

The second part of my thesis I have deliberately almost ignored, not because my time is up, but because I need not debate it. If evolution is true, it must be taught in all the schools. The whole question is: Is evolution true?

If Dr. Riley tells us that, whether evolution is true or not, he will oppose its teaching, he puts himself in the ambiguous position of saying to the men and women of this nation that truth shall not be taught to the children in the schools.

I believe that I have in a simple outline justified that unanimous verdict of the men of science of the world. That is all you will require of me in the opening speech. Now, I ask for some alternative explanation of that convergence of the four or five massive lines of evidence for the doctrine of evolution. I ask for some general explanation other than that I have put before you. But I am particular that you keep clearly in your mind that intellectual conception of the doctrine of evolution as an interpretation of the nature that lies before you, and I am sure you will find in the end that those men of science are justified who say that never until Darwin appeared was there so illuminating a truth. Never was there such a sudden light thrown upon the problems that have agitated the human mind during the last two thousand years. (Applause.)

———

THE CHAIRMAN:—On the other side, Dr. Riley will speak for twenty-five minutes.

———

DR. W. B. RILEY:—Mr. chairman, ladies and gentlemen: I have listened, as I have on former occasions, to my friend and opponent, Professor McCabe, and have been reminded, as I have been on previous occasions, of what President King of Oberlin said: "An educated man can make a fair speech on any subject." And I am willing to consent that my brother has done the best he could with the theme that he had in hand. (Laughter.)

A great many of you have, doubtless, at some time or other, seen, in the streets, little youngsters carrying a balloon. The thing is beautiful as long as it has human breath in it. But the moment you puncture it, it is a sad-looking affair. And that is exactly what I propose to do with this McCabe speech. (Applause.)

I want, therefore, to set aside all irrelevant discussion, and I can do that by agreeing absolutely with Professor McCabe's last point. If evolution is true, by all means it should be taught in public schools. It should be taught everywhere. (Applause.) The truth should be taught. (Applause.) But if evolution has no truth in it, not a scintilla of science, then it should be suppressed, and not imposed upon immature minds. That is my contention. (Applause.)

This is the sixth debate that the Professor and I have engaged in. Each time he has begun as he did and ended as he did tonight. He has one forceful argument, namely, that "all scientific men are agreed."

It would seem to me after having read the Professor's published books, as I have assiduously done, that he should have learned by this time that no science is established by the counting of noses. Now, as a matter of fact, he does know that, and he has consented to that very proposition.

I want to quote from him tonight: (Reading) *"We do not even 'rely on the testimony of millions' if they have nothing better for their assertion than the negative evidence. Men, even scientific men and philosophers, have been convinced for ages that certain ideas were true; and yet were compelled at last to recognize their falseness."*

Certainly, that is his own statement. That is a quotation from his own writings: "* * * compelled at last to recognize their falseness." That is exactly what is to happen to the evolutionary philosophy. In fact, that is what has happened to it more than once already.

Instead of having been born with Charles Darwin in 1859, this doctrine was in great vogue six hundred years before Jesus Christ was born. Those old Greeks originated and taught it. It was one of their favorite philosophies. But it perished from sheer weakness, and was blotted out of sight and forgotten for more than two millenniums, and then, Charles Darwin's grand-father, old Erasmus, began to give it expression, Charles gave it voice and in the present-day teaching it is screaming aloud. But greater activity is not always evidence of life.

I was brought up on a farm, and I have cut off the head of many a chicken, and I have seen him far more active when his head was off; he was dead but he did not know it. That is the exact condition of this thing at the present time. It is in its death throes. I am here tonight to just give it another little tap and put it out of its misery. (Applause.)

Let me say that all scientific men are not agreed on this subject. On the other hand, there never was a subject before scientific men on which there was such confusion. You can take any single point by which this system is built up, and there are no two outstanding men that will agree upon it.

Start, if you please, with "the origin of things!" They are not agreed at all. Take up the subject of "natural selection!" They are not agreed there. Not at all! You have the Darwin notion; you have Marx's: you have the McCabe notion, and no two of them are agreed.

I have tried, in every debate that I have met my opponent, to force him to employ arguments that are used in the textbooks of the schools at the present time,

and I can't get him to do it. I dare him to take up those arguments, the arguments that are taught these boys and girls here, viz., "spontaneous generation," "Natural selection," "Recapitulation," etc. I stand ready tonight to quote textbooks and refute every one of those steps by which this system has been built up. I challenge him tonight to take up any one of them.

Now, he has touched very slightly upon two or three of them, one of them seldom found in the textbooks, but the other two prevalent everywhere. Let me take up two or three that he has touched so lightly.

First of all, he said that the distribution of animals and plants over the world absolutely agrees with the law of evolution.

A statement is not a science. That statement is absolutely without proof. On the contrary, it is opposed to reason even. If what these gentlemen believe to be so is so, and sometimes, somewhere (nobody knows when, nobody knows where, nobody knows how) life came to a single cell, that cell would have been located and, in consequence of that fact, the continent on which the birth takes place would have been covered and peopled and other continents left bare.

We find nothing of the sort. There isn't a single thing in the creative record in Genesis that indicates that God only made one blade of grass. Not a thing. There is not a thing to indicate that God started life in one place only. On the contrary, the whole earth-record plainly shows that he filled the earth with plants and birds and fishes and animals from the beginning, even as the statement is made; and so I say that this distribution of plants and animal life is in absolute accord with the creative theory, and has nothing in common with the evolutionary philosophy.

Now, he calls our attention to two continents and asks the question why? It is very easy to answer that. Why was there nothing found in New Zealand above the Tuatara? And why was there nothing found above the Kangaroo in Australia? Well, I would like to turn that question back upon him. If his law is operative, it ought to operate in those continents, as well as in others, and the higher forms should have been found.

If, on the other hand, the deluge record in Genesis is true, death might have ensued there very easily and most completely, and the animals and birds that were have been destroyed and swept away from that place.

Do you not know that from Key West clear up here to south of Baltimore there is a deposit of bone substance, simply millions of tons in extent, that cannot be accounted for in any way, known to the mind of man, except to admit the Genesis flood, and that the animals that were destroyed on the continents were swept around with the water until they struck land and piled up in heaps on both sides of our continent, as is the testimony? So his argument turns back upon himself, and I ask him to explain.

Again, if I were advocating a law that had been paralyzed, as he says in one of his books, 250 million years ago in New Zealand, and 200 million years ago it had another stroke in Australia, I would be afraid that the old thing would have a third stroke and perish on my hands! No reason in the world why the law should not be operative there if it were operative anywhere. *(To be continued in the next issue.)*

FUNNYMENTALS.

The New York debate has made more evident to this editor than ever before that those meek-eyed, modernistic professors who are teaching this philosophy (evolution) to beardless boys and immature girls, are sowing the seeds of anarchy. Seldom in a lifetime will one face a company of people more prejudiced in thinking, more opposed to all moral and ethical ideals, more ready to hiss the name of God and consequently so ready to oppose all authority and government as this assemblage of New York atheists and agnostics proved to be. If evolution continues to be taught in America until a generation becomes infected with it, we will reproduce for our country the Russian experience and in a few years, by bloody revolution, Bolshevism will be in control.—Rev. Wm. B. Riley in *The Christian Fundamentalist*, March, 1929.

Here is my definition for evolution: Evolution is the theory that sometime, somewhere in the illimitable past by a fortuitous combination of non-entities, something emerged from the little end of nothing, by the inherent power of resident forces.—Rev. C. H. Cotton in *The Defender*, March, 1929.

Man cannot be the offspring of any kind of animal. Man is *sui generis*. He is directly created in the divine image, and that is what gives him his uniqueness. This is proved by the fact that Adam could not find "a help meet for him" among any of the animals of the Edenic garden (Gen. 2:20). This theory of man's evolution from an animal pedigree is a crude theory, anyway, and arises from earthly thinking.—*The Bible Champion*, March, 1929.

In speaking of man in connection with animals it is better not to speak of "lower" animals, implying that man is an animal, but only one of higher degree or kind. Man has many factors in common with vegetable life; why not call him a vegetable, only of a higher kind? He has much in common with the inorganic realm; why not call him a clod of a somewhat higher order? No; man is *genus homo;* he belongs to an order of his own. Man has more fundamental elements in common with God and the angels than he has with the animals.—*The Bible Champion*, March, 1929.

A 22-ACRE ESTATE on the Hudson with a 23-room brick building. Garage. With all modern conveniences. Two hours from New York. Bargain for quick sale.
DR. N. S. HANOKA,
65 W. 117th St., New York.

Catalogue of anti-religious books free
ATHEIST BOOK STORE
119 East 14th St. New York City

EVOLUTION BOOK SHELF

OUR FACE FROM FISH TO MAN: Wm. K. Gregory 4.50
SCIENCE & GOOD BEHAVIOR: Parshley $2.50
THE NATURE OF THE PHYSICAL WORLD: A. S. Eddington 3.75
THIS PUZZLING PLANET: Edwin Tenney Brewster 4.00
A B C OF EVOLUTION: Joseph McCabe 1.75
GROWING UP: Karl de Schweinitz 1.75
HEIR OF ALL THE AGES: McKechnie 3.50
CREATION BY EVOLUTION: Edited by Frances Mason 5.00
THE BRAIN FROM APE TO MAN: Frederick Tilney 25.00
LET FREEDOM RING: Arthur Garfield Hays 2.50
EVOLUTION FOR JOHN DOE: Ward.. 3.50
EXPLORING THE UNIVERSE: Ward.. 3.50
DARWIN, THE MAN AND HIS WARFARE: Henshaw Ward 5.00
WAR ON MODERN SCIENCE: Maynard Shipley 3.00
MY HERESY: Bishop Wm. M. Brown.. 2.00
CONCERNING MAN'S ORIGIN: Sir Arthur Keith 2.00
HISTORY OF WARFARE OF SCIENCE WITH THEOLOGY: White (2 vols.).. 6.00
OUTLINE OF MAN'S KNOWLEDGE: Clement Wood 5.00
SCIENCE VS. DOGMA: C. T. Sprading 1.50
MICROBE HUNTERS: Paul de Kruif.. 3.50
ORIGIN OF SPECIES: Darwin 1.00
MAN'S PLACE IN NATURE: Huxley.. 1.00
CREATION: NON-EVOLUTIONARY THEORIES: Brewster 3.50
RIDDLE OF THE UNIVERSE: Haeckel 2.50
THE BIBLE UNMASKED: Joseph Lewis 1.15
THE STORY OF THE INQUISITION... 3.20
EVOLUTION: Monthly, One Year..... 1.00

Sent postpaid by

EVOLUTION, 96 Fifth Avenue, New York.

SUMMER HOME IN THE PINES of South Jersey for four children, 5 years up. Private beach. Trained refined lady in charge. $15 weekly. References exchanged. — Write S. R., 4 West 15th St., Room 408, N. Y. C.

Best Books on Fishes

FISHES IN THE HOME
By Ida Mellen, $1.75
For all who keep an aquarium.

YOUNG FOLKS' BOOK OF FISHES
By Ida Mellen, $2.00
For young folks of all ages.

DODD, MEAD & CO.,
NEW YORK CITY.

Explore Russia

See the New Civilization in Its Ancient Setting

All Expenses Complete Tour **$375 up**

Free Soviet Visas - Weekly Sailings

Stopover privileges in London, Paris, Vienna, Berlin, etc.

AMERICAN RUSSIAN TRAVEL AGENCY, Inc.

Telephones:
Chelsea 4477 and 5124
100 Fith Ave., New York City

THE ILLUSTRATED STORY OF EVOLUTION

By MARSHALL J. GAUVIN

48 Illustrations

This book makes science as absorbingly interesting as romance, while telling the most wonderful story the human mind can learn—the story of the coming forth of all existing things.

Cloth, $1.25, postpaid.

THE TRUTH SEEKER CO.
49 Vesey Street New York

THE BIG FIGHT IS ON!

43 States are in legislative session in the year 1929—

19 other States besides Arkansas are menaced by the possibility of anti-evolution initiative measures—

The Fundamentalists have met, 100,000 strong, in Indianapolis, to continue the war against modern science. Help us to protect freedom in teaching evolution and continued separation of Church and State in America!

SCIENCE LEAGUE OF AMERICA, INC.
504 Gillette Bldg., San Francisco, California.
Dues $3 a year; life membership $25.
Information leaflet on request.

ONLY A FEW MORE

May Join Upton Close's 1929

EXPEDITION TO THE ORIENT

and only if they apply quickly.

June 24th-September 15th—Seattle to Seattle. Food, shelter, transportation four weeks on the Pacific Ocean, eight weeks in Japan, Korea, Manchuria and China—seeing the places only Upton Close, the adventurer, knows—meeting the people only he has access to—hearing the interpretations only he can give.

Come back through Russia if you desire.

Write promptly to:

Upton Close Student Adventure
27 West Tenth Street, New York City

MT. AIRY IS A COMMUNITY IN THE MAKING where artists and radicals write books, teach children, compose music and do other worth while things all the year through. It has a brook, beautiful woods, many fine views of the Hudson, running water, electric light and telephones. It adjoins the village of Croton-on-Hudson, is one hour from Grand Central, and has the best commuting service out of New York City. Twenty-five houses and bungalows now on the property and building going on steadily. Minimum size plots, ¼ acre with improvements, $600 to $700. Cash or terms.

For rent: Small Bungalow, all improvements, $250.00 per season.

Inquire Harry Kelly, 104 Fifth Ave., Tel Watkins 7581.

Europe

ALL EXPENSES $300 UP
THE LEADING STUDENT TOURS
Cunard renown! 7000 satisfied guests! They are our pledge for the happiest summer of your life. Booklet 5¢.
STUDENTS TRAVEL CLUB
551-FIFTH AVE.-N.Y.C.

HEALTH FOOD Not Breakfast Food

Food for every meal and for every ailing person—has stood the public test 29 years. Tyler's Macerated (whole) Wheat Combination — fruit, nuts, etc. (no drugs)—tasty, ready to eat—banishes constipation at once, restoring normal health and strength. Incomparable for women in delicate condition. Send dollar or check for week's supply on a money-back guarantee. BYRON TYLER (Estab. 1899), 1920 Gibraltar Building, Kansas City, Missouri.

THE NATION

A challenging review of contemporary life:
politics, books, music, drama and art.

Prints news the dailies don't

Three Months Trial
$1

20 VESEY STREET,
New York.

AMERICAN SECULAR UNION

stands for the principles proclaimed in the Nine Demands for Liberalism or the complete separation of church and state. Organized 1876. Incorporated 1900 under the laws of Illinois. A representative national organization, managed by a board of directors, elected by the membership every third year. Annual membership, $1.00; Life, $10.00.

Address all communications to
W. L. MACLASKEY, Secretary,
P. O. Box 1109, Chicago, Illinois.

THE TRUTH SEEKER

National Freethought Weekly
Established 1873
GEORGE E. MACDONALD, Editor
Three months, $1. Foreign, $1.15
49 Vesey Street, New York

Jesus Christ Was an Evolutionist

The Bible teaches this law of nature very plainly.

The essay that won the Los Angeles Examiner prize.

Sent for ten cents.

Address: S. J. BROWNSON, M.D.
Soldiers' Home, Sawtelle, Calif.

ATHEIST REPORT

"Hillbillyism," "The Arkansas Campaign," "The Masonic Church," "Atheism Over the Radio," "The Straton Case," "The Cohabitation of Church and State," "Pennsylvania, Arkansas of the North," "Cohesive Catholics," and "The Spread of Atheism," are some of the headings in the Third Annual Report of the A. A. A. A., covering the present warfare between Science and Religion. The four A appeals for members and support to combat the Church and the Clergy. Keep abreast of the times by writing for free copy of the Third Annual Report.

Address:

American Association for the Advancement of Atheism,
Incorporated
119 EAST 14th STREET NEW YORK CITY.

Friday, April 12th
at 8:15 P. M.
LECTURE EXTRAORDINARY:
"The Royal Road to Learning"
by
ALLAN STRONG BROMS
Admission fifty cents
UNION AUDITORIUM, 229 W. 48th St., NEW YORK, N. Y.

just published

The Proofs of Evolution

by HENSHAW WARD

Appeared originally as series of articles in EVOLUTION. Resulting demand necessitated republication as booklet. Simplest, clearest explanation of the evidence for evolution, emphasizing its significance rather than reciting its details.

10c. each, 15 for $1.00, $5.00 per hundred.

Sent postpaid on receipt of price.

EVOLUTION, 96 Fifth Ave., New York, N. Y.

IN THIS ISSUE

we begin publication of the stenographic record of the McCabe-Riley Evolution Debate. It will be continued in May, and completed in the June number of EVOLUTION. Since

RILEY HAS REFUSED

to publish the record of this debate in his magazine, even a blind man could tell who had the better of the argument.

AFTER READING THE OPENING

speeches in this issue, you will surely want your friends to read them, too, and also to place these arguments before the fundamentalists in your community. Accept this

SPECIAL SHORT TIME OFFER:

We'll send you a bundle of five copies of each of the three numbers containing Debate in full for $1. We'll send these three numbers to new subscribers at only 20 cents each if you send them in lists of five or more. This is your opportunity.

EVOLUTION,
96 Fifth Avenue, New York, N. Y.

(Three months to five or more addresses, each .20)
(Bundle of five to one address, three months $1.00)

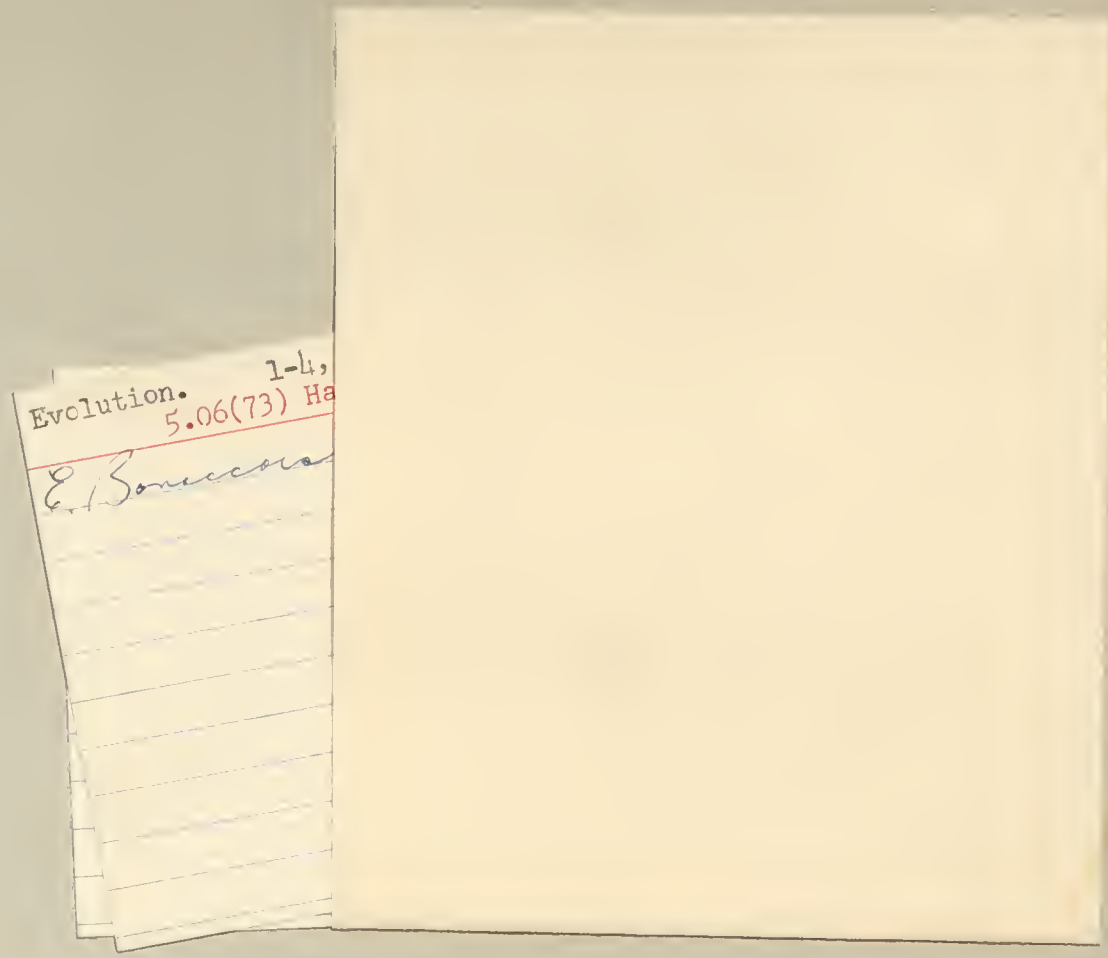
I enclose $_____. Send a bundle of _____ copies, April, May and June (containing McCabe-Rileydebate) to

Name	Street and Number	City and State

Also send EVOLUTION for three months (containing stenographic record of McCabe-Riley debate) to

(Single Subscription, $1.00 per year)

(Continue. Fill as many sheets as you like)



Gaylord
MULTIBINDER
Syracuse, N. Y.
Stockton, Calif.